



A.D. 1840 . . . . . N° 8688.

S P E C I F I C A T I O N

OF

ANDREW KURTZ.

FURNACES.

L O N D O N :

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## Furnaces.

### KURTZ'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, ANDREW KURTZ, of Liverpool, in the County of Lancaster, Manufacturing Chemist, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Fifth day of November, One thousand eight hundred and forty, and in the fourth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Andrew Kurtz, Her especial licence, full power, sole privilege, and authority, that I, the said Andrew Kurtz, my executors, administrators, and assigns, and such others as I, the said Andrew Kurtz, my executors, administrators, and assigns, should agree with, and no other, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England and Wales, and the Town of Berwick upon Tweed, my Invention of "A CERTAIN IMPROVE-  
MENT OR CERTAIN IMPROVEMENTS IN THE CONSTRUCTION OF FURNACES;" in which Letters Patent is contained a proviso, that I, the said Andrew Kurtz, shall cause a particular description of the nature of my said Invention, and in what manner the same is to be performed, to be enrolled in Her Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said Andrew Kurtz, do hereby declare that my said Invention, and the manner in which the same is to be performed, is particularly described and ascertained in and by the Drawings hereto annexed, and the following explanation thereof (that is to say) :—



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*Kurtz's Improvements in the Construction of Furnaces.*

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My improvements in the construction of furnaces consist in a certain novel and peculiar arrangement of the fire bars upon which the fuel is to be placed, and also in an improved arrangement or application of certain air passages, chambers, or flues to be used in combination with the improved grate, and together composing the furnace. The principal object of my improvements is 5 designed to effect the consumption of smoke, and consequent economy of fuel, by preventing the smoke and other gaseous products of combustion ascending the flue or chimney. This is effected partly by means of the peculiar positions of the grate bars in the furnace, and also by the particular arrangement and construction of the air chambers or passages by which I am enabled to convey 10 heated air into the furnace, and to introduce the air at the required temperature at different parts of the furnace, causing it to impinge immediately upon the smoke or unconsumed combustible matter all over the fire bed upon the grate by means of an unlimited number of apertures on each side of the furnace, and in front of the fire bridge of the furnace, which occasions the whole 15 of the smoke or gaseous product to be burnt so effectually, as while it greatly increases the amount of heat usually evolved, prevents at the same time the annoyances which unburned combustible matter must ever occasion. But in order that my improvements may be more fully explained, I have attached to these Presents a Sheet of Drawings representing several views of my improved 20 furnace, and shewn by way of illustration, as they may be practicably applied to boilers of steam engines, &c. The principle of my improvements will be readily understood by reference thereto, and for the sake of more perfect illustration I have represented two distinct constructions of furnaces, the one as applied to the ordinary waggon boiler, and the other as applied to the tubular boiler of 25 a stationary steam engine. Fig. 1 represents an external end elevation of the boiler and furnace; Fig. 2, a transverse sectional view of the same; Fig. 3, a plan or horizontal view of the walls of the furnace and air passages, with the boiler and upper courses of brickwork removed; and Fig. 4 is a view taken in isometrical perspective through the same, one of the outer walls being 30 removed. This construction of furnace consists of two separate fire chambers or compartments formed by the side walls *a*, *b*, *c*, and the grate or fire bars *d*, *e*, *f*. It will be seen in Fig. 4 that each grate or fire-place consists of three distinct and separate sets or series of fire bars, those marked *d* inclining obliquely downwards from the entrance or fire door towards the bridge; those 35 marked *e* lying perfectly horizontal, and those marked *f* inclining obliquely upwards from thence towards the bridge, thus forming a hollow fire bed or grate, having a sufficient depth or substance in the middle for the ordinary heating purposes of the furnace (which may be suitably accommodated by



FIG. 1.

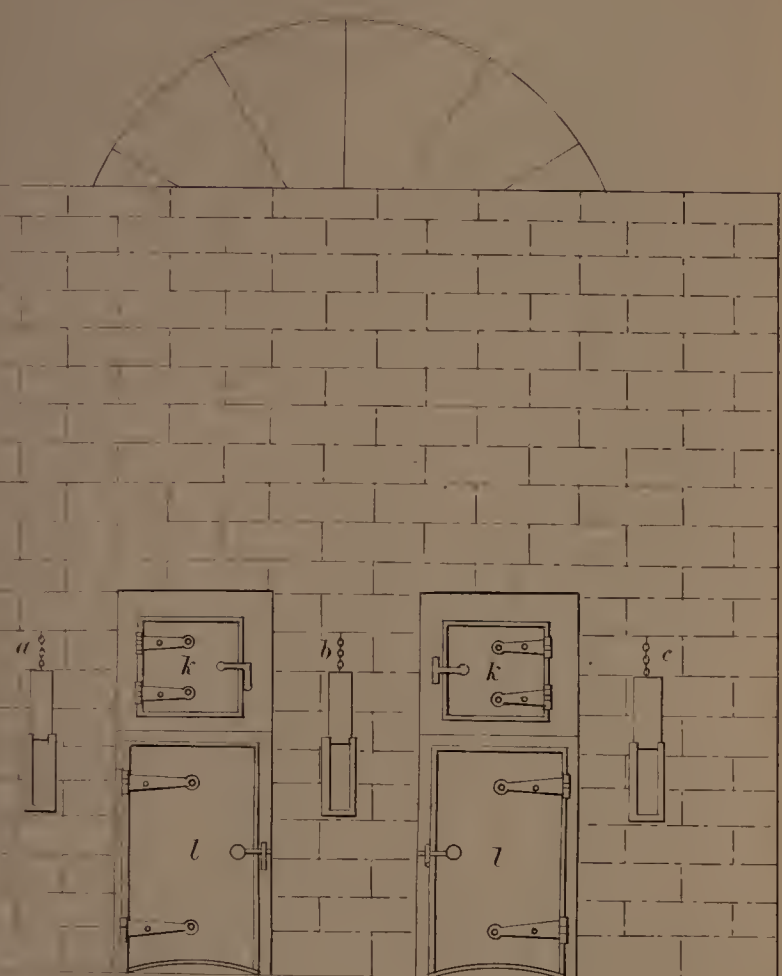


FIG. 2.

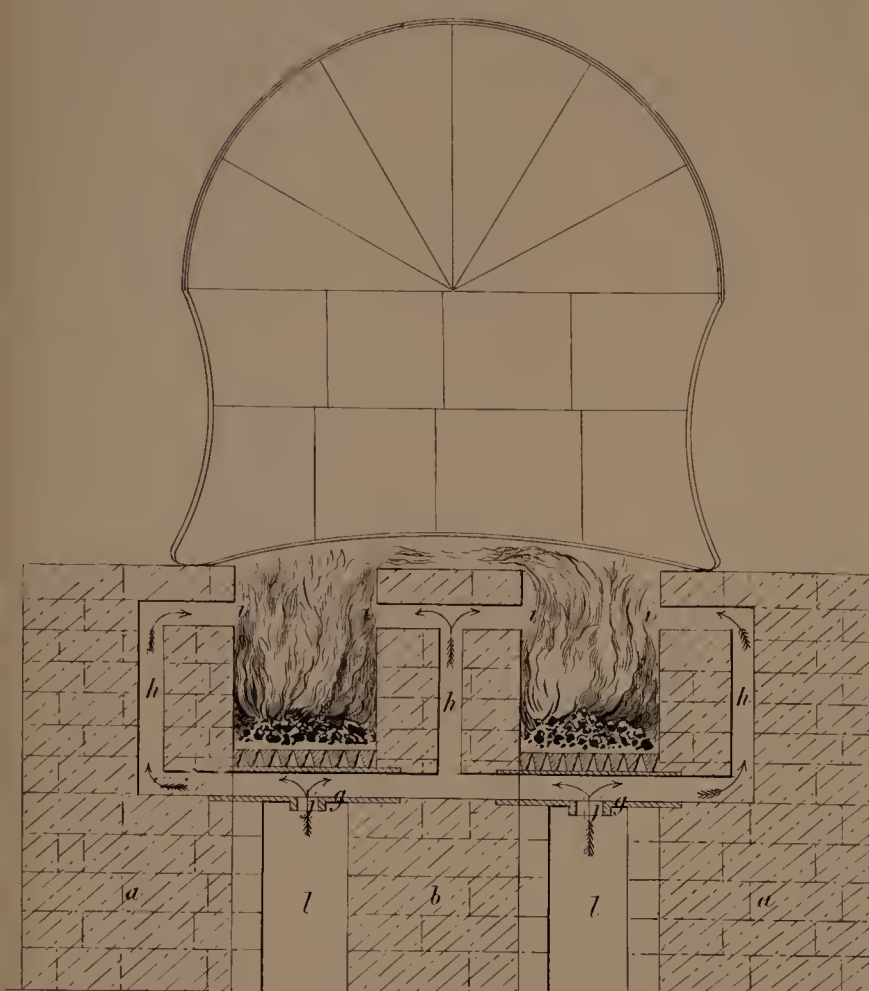


FIG. 5.

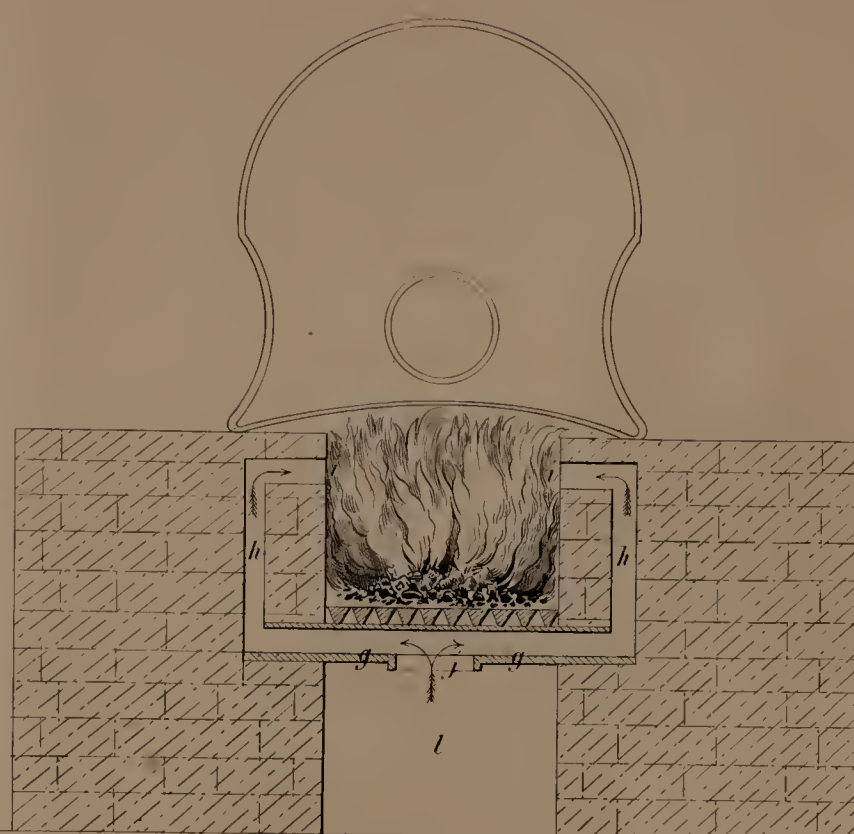


FIG. 6.

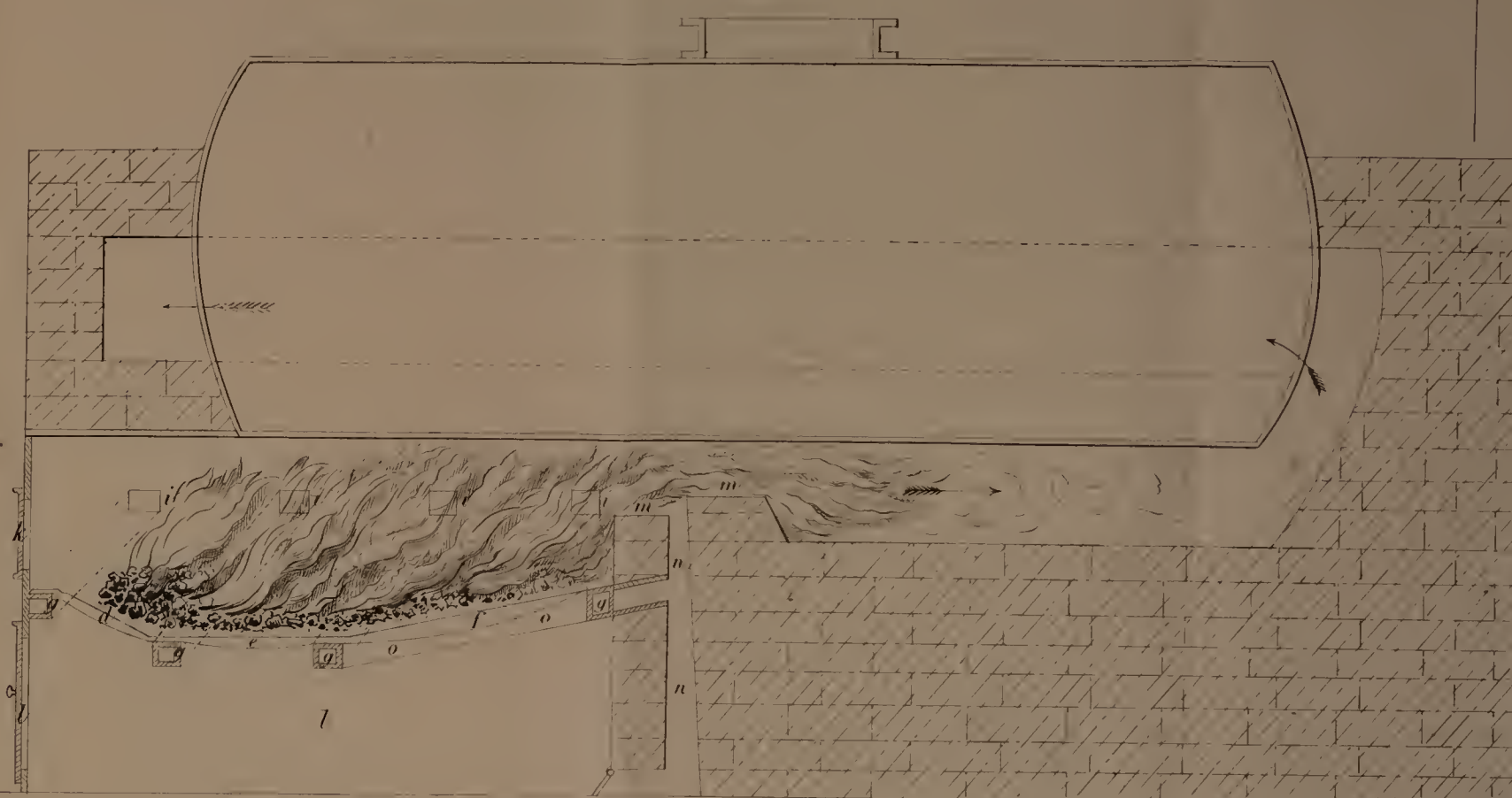


FIG. 3.

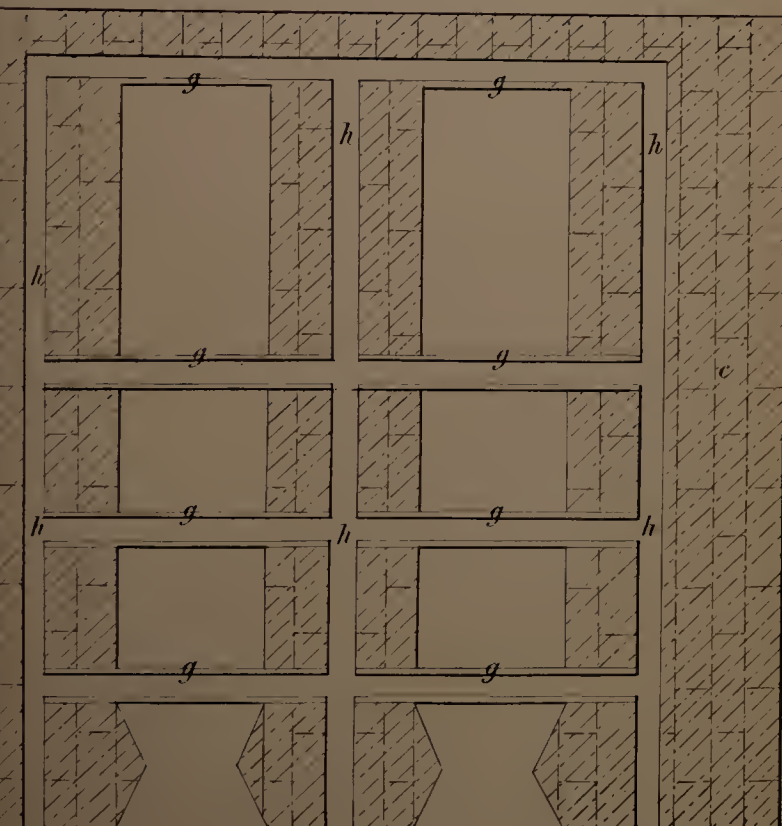


FIG. 4.

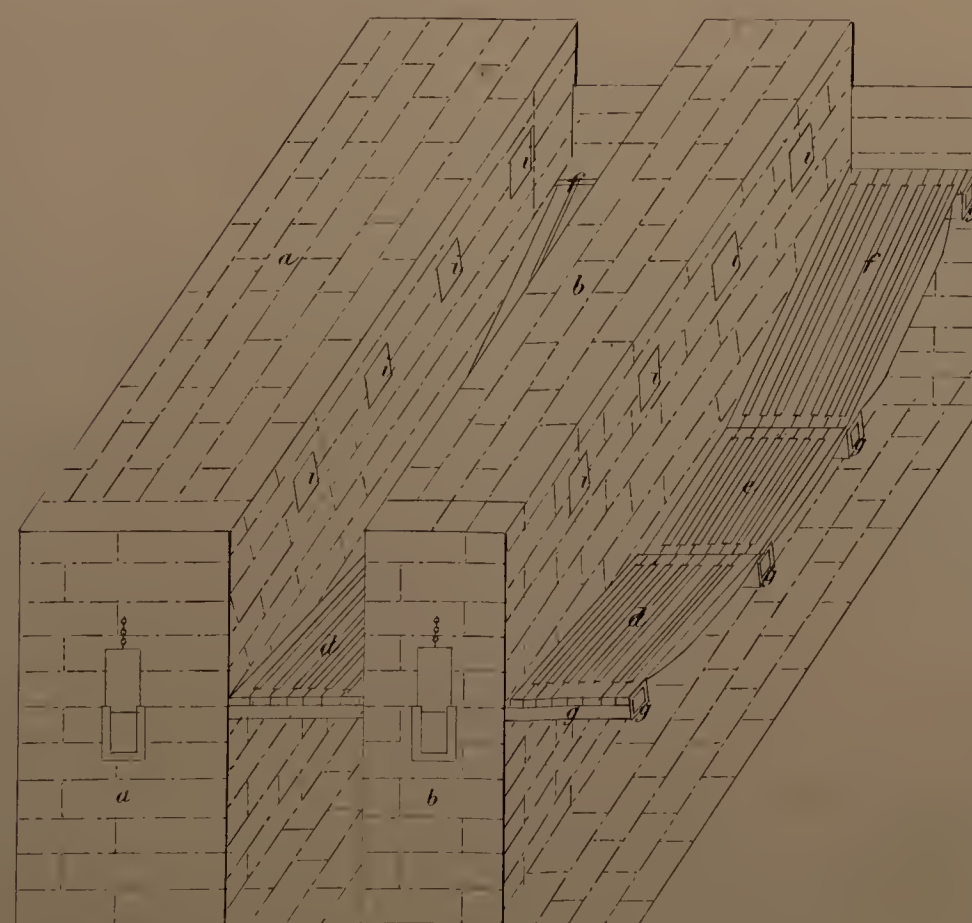
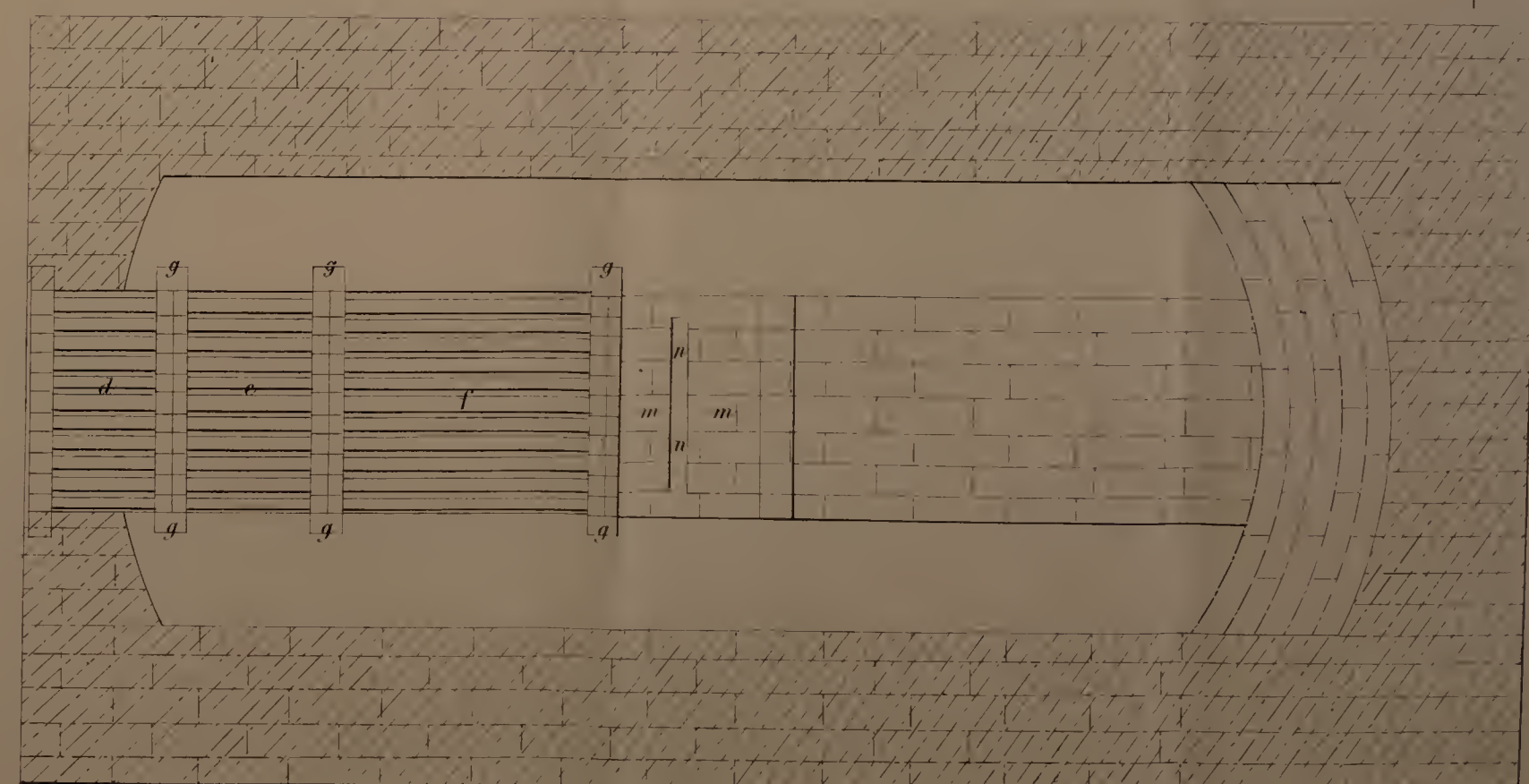


FIG. 7.







*Kurtz's Improvements in the Construction of Furnaces.*

modifying the length of the bars *l, l,*) and also having a thinner layer of heated coal, gradually diminishing towards the bridge, and approaching towards the bottom of the boiler, to assist the combustion of the smoke by means of the air passing between the fire bars and charred coals at that point just below  
5 the bridge. The series of fire bars *d, e, f,* are all supported by transverse hollow bearers *g, g, g,* let into the side and middle walls of the furnace *a, b, c,* and communicating with the air passages or chambers *h, h, h, h,* formed in the brick work or walls of the furnace; these hollow bearers *g, g, g, g,* and the chambers or passages *h, h, h, h,* are all in continuous connection with each  
10 other, opening into the furnace or fire-places at the apertures *i, i, i, i.* The hollow bearers *g, g, g, g,* are open to the ash pit by having an aperture formed underneath at *j,* and by being in connection with the passages *h, h,* also communicate with the apertures *i, i, i, i,* in the furnace. It will be observed that the passages *h, h,* must be closed from the external atmosphere by shutting  
15 the doors *h<sup>x</sup>, h<sup>x</sup>,* which are only opened occasionally to clean the flues. Now the fire doors *k, k,* being closed, and the ash pit *l, l,* being partially closed (having only a slight opening left at the bottom for the requisite supply of air), the air will rush into the hollow bearers *g, g,* and also into the passages *h, h,* in the furnace walls; and being greatly heated by the action of the fire, will  
20 dissipate itself through the passages or chambers *g* and *h,* and rushing into the furnace through the several apertures *i, i, i, i,* will immediately impinge upon the unconsumed combustible matter above the fire bed, and in an unlimited number of streams or currents, so that the smoke and other gaseous products will be effectually consumed, instead of passing away to the flue or chimney.  
25 I would here also remark, that should it be found any portion of smoke yet unconsumed passes off, a further extension of the hot air passages may be made by connecting the hollow bearers *g, g,* with side passages leading to a further air chamber or passage constructed in the bridge of the furnace, and opening the whole width of the bridge at the top into the furnace, so as further to act  
30 upon that portion of the smoke (if any) as it passes over the bridge, but this I hardly consider necessary in furnaces constructed as above explained. Another construction of furnace is represented at Figs. 5, 6, and 7; Fig. 5 being a transverse section; Fig. 6, a longitudinal section; and Fig. 7, a horizontal or plan view of an improved furnace, as adapted to a tubular boiler. In these Figures  
35 the principle feature of my improvements is also similarly applied, as in the furnace just described, and has all the same parts marked with corresponding letters of reference, as in the former Figures, excepting only that in these Figures I have represented the bridge *m, m,* as divided, having a passage *n* for the heated air constructed in it, and opening into the furnace the whole width of the



*Kurtz's Improvements in the Construction of Furnaces.*

fire-place, and supplied with air by side branches or passages *o, o*, connected with two of the hollow bearers or air passages *g, g*, and opening into the said passage in the bridge, so that any smoke which may be escaping towards the chimney will thus be effectually consumed.

Having now fully and particularly explained my improvements in the construction of furnaces, I would here remark, in conclusion, that the dimensions of the furnace in all particulars, and the length of the fire bars, must of course be dependant upon the length of the boiler, and the steam power required; and I have merely shewn such a proportion of furnace in the Drawings as will be sufficient to illustrate my improvements, and also that they are equally applicable to boilers for marine as well as stationary steam engines. But I claim as my Invention the peculiar positions of the fire bars, particularly their rising obliquely from the fire door towards the bridge of the furnace, together with the hollow bearers underneath them, by which I obtain the heated air to be distributed through the various air passages in the furnace, which is caused to impinge upon the smoke over the fire bed in an unlimited number of currents passing through suitable apertures constructed in the furnace or fire-place in front of the bridge; and also the auxiliary air passage formed in the bridge behind the fire bed, if necessary, in furnaces constructed for marine purposes, or in such situations where a sufficient quantity of heated air cannot be introduced over the fire bed.

In witness whereof, I, the said Andrew Kurtz, have hereunto set my hand and seal, this Fourth day of May, in the year of our Lord One thousand eight hundred and forty-one.

ANDREW (L.S.) KURTZ.

**AND BE IT REMEMBERED**, that on the same Fourth day of May, in the year above mentioned, the aforesaid Andrew Kurtz came before our Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and everything therein contained, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute in that case made and provided.

Inrolled the Fifth day of May, in the year above written.

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